Description of a New Species of *Longidorus* (Dorylaimida: Longidoridae) from Ishigaki Is., Japan

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A new *Longidorus* species collected from the rhizosphere of *Pleioblastus linearis* (Gramineae) in Ishigaki Is., Okinawa Prefecture, Japan is described and illustrated. *L. ishigakiensis* n. sp. is characterized by the continuous lip region, bluntly rounded tail, long odontostyle (172 (158-181) μm), and extremely posteriorly located guiding ring (90.7 (83.1-94.6) μm). This new species resembles *L. laricis* Hirata, 1995, *L. litchii* Xu and Cheng, 1992, *L. naganensis* Hirata, 1995 and *L. orongorongensis* Yeates, Van Etteger and Hooper, 1992, in long odontostyle and especially posterior position of guiding ring, but differs from *L. litchii* in having larger c′ value and longer tail length in female, and rounded tail of the first-stage juvenile, from the other three species in having larger c′ value and narrower lip region width. Juveniles of this new species are separated into three developmental stages based on the lengths of bodies, odontostyles and replacement odontostyles. Jpn. J. Nematol. 32 (1), 1-6 (2002).

Key words: developmental stages, morphology, taxonomy.

An undescribed species of the genus *Longidorus* was extracted from soil samples around the rhizosphere of *Pleioblastus linearis* (Gramineae) in Ishigaki Is., Okinawa Prefecture, Japan. This nematode is described herein as *Longidorus ishigakiensis* n. sp.

Specimens examined in this study were extracted from soil samples by a modified Cobb's decanting and sieving method. They were killed and fixed in boiling double-strength F P 4: 1, and processed to glycerol by Seinhorst's rapid method (Seinhorst, 1959) and mounted on permanent slides in dehydrated glycerin.

Longidorus ishigakiensis n. sp.

(Fig. 1)

Measurements. *Female*. Holotype: L=6.22 mm; a=113; b=9.3; c=145; c′=1.17; V=49.0; odontostyle=175 μm; odontophore=93 μm; anterior end to guiding ring=91.6 μm; tail=42.9 μm; anal body width=36.6 μm. Measurements of paratype females and juveniles are shown in Table 1.

Descriptions. *Females*. Body large size, almost cylindrical, gradually tapering toward both ends, habitus varying from 'C' to spiral shape when relaxed by gentle heat, with most of curvature in the posterior half. Cuticle smooth by light microscope observation, composed of two layers; 4-5 μm thick on front part of neck adjacent to lip region, 4-6 μm thick at mid-body, 11-15 μm at tail terminus, with very fine radial striations on tail. Body pores generally indistinct, 6-9 lateral, 1-2 ventral and 1-2 dorsal pores in

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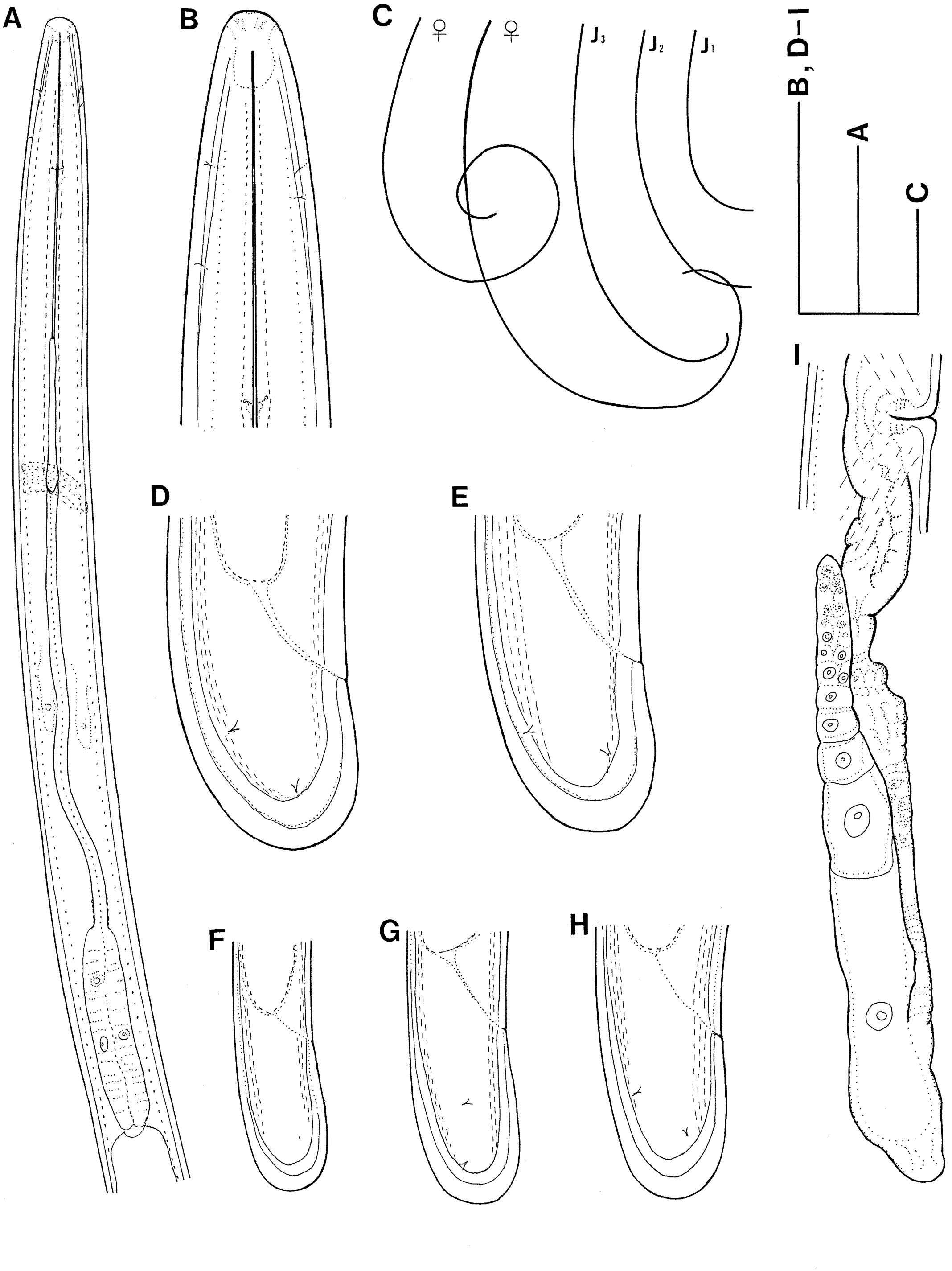

Fig. 1. *Longidorus ishigakiensis* n. sp. Females. A: Oesophageal region, B: Head region, C: Habitus, D, E: Tail, I: Vulva and posterior genital branch. Juveniles. C: Habitus. F-H: Tail of first, second and third stages. Scales: A = 100 µm; B = 50 µm; C = 1 mm; D-H = 50 µm; I = 100 µm.

Table 1. Measurements of paratype females and juveniles of *Longidorus ishigakiensis* n. sp.

	J_1	J_2	J_3	Females
n	19	25	19	20
L (mm)	1.97±0.10* (1.67-2.09)	3.02±0.26 (2.56-3.55)	4.24±0.38 (3.57-5.08)	5.97±0.42 (5.31-6.85)
a	76±3.6 (65-80)	90±3.4 (82-100)	105±4.3 (98-114)	117±6.6 (106-130)
b	5.4±0.5 (4.1-6.2)	6.9±1.3 (5.2-10.2)	8.1±0.9 (6.9-9.7)	10.2±1.0 (8.5-12.1)
c	54±4.5 (43-59)	76±6.4 (64-94)	102±9.0 (88-124)	149±9.5 (133-169)
c′	2.2±0.14 (1.9-2.5)	1.7±0.15 (1.4-1.9)	1.4±0.10 (1.2-1.6)	1.1±0.06 (1.0-1.2)
V	-	-	-	48.0±1.62 (45.4-51.0)
Odontostyle (μm)	106±2.8 (102-112)	126±2.5 (121-130)	144±6.8 (126-153)	172±6.5 (158-181)
Odontophore (μm)	54±1.7 (51-58)	66±5.6 (53-76)	80±4.8 (71-90)	92±4.5 (83-99)
Total stylet (μm)	161±3.0 (156-169)	192±6.7 (179-206)	224±8.3 (208-236)	264±6.7 (251-276)
Replacement odontostyle (μm)	125±3.3 (115-131)	144±6.6 (131-159)	173±6.1 (161-183)	-
Anterior end to guiding ring (μm)	45.0±1.26 (42.0-47.1)	65.8±2.59 (62.3-75.3)	77.2±2.86 (72.3-80.8)	90.7±3.05 (83.1-94.6)
Tail (μm)	36.5±1.97 (32.1-40.2)	39.7±2.48 (33.7-43.1)	41.6±2.20 (38.6-45.6)	40.2±2.52 (35.3-46.3)
Lip region width (μm)	8.6±0.23 (8.4-9.0)	10.3±0.31 (9.8-10.8)	12.0±0.42 (11.2-12.9)	13.8±0.34 (13.3-14.3)
Body width at guiding ring (μm)	18.6±0.45 (17.7-19.3)	23.8±0.98 (22.0-26.5)	28.4±0.89 (27.3-30.5)	33.8±0.97 (32.1-35.8)
Body width at oesophagus base (μm)	25.9±1.02 (24.1-27.3)	32.8±1.94 (28.9-36.2)	39.6±2.73 (35.7-46.6)	47.4±2.01 (44.3-50.6)
Body width at mid-body (μm)	26.0±1.07 (24.1-27.3)	33.5±2.47 (28.9-39.4)	40.5±3.55 (34.1-44.5)	50.9±3.28 (45.9-57.1)
Anal body width (μm)	16.7±0.50 (15.6-21.0)	23.0±1.81 (20.9-28.9)	30.3±2.08 (26.8-35.4)	36.6±1.57 (33.9-40.0)
A**	2.18±0.08 (2.04-2.31)	2.31±0.07 (2.17-2.46)	2.36±0.08 (2.21-2.49)	2.46±0.06 (2.33-2.57)
B***	5.25±0.23 (4.66-5.59)	6.38±0.25 (5.96-6.99)	6.42±0.30 (5.79-6.88)	6.60±0.25 (5.89-6.98)

* mean±standard deviation (range).
** Body width at guiding ring/Lip region width.
*** Anterior end to guiding ring/Lip region width.

the oesophageal region. Lip region smooth, anteriorly round and continuous with the body contour. Amphid pouches broad and unlobed. Amphid aperture obscure. Odontostyle attenuated, 158-181 μm long, with a simple junction with odontophore. Odontophore slightly bulges at the base. Guide ring single, extremely posteriorly situated at 90.7 (83.1-94.6) μm or 6.6 (5.9-7.0) times lip region width at the outer circle of labial papillae from the anterior end. Nerve ring located in the base of odontophore. Hemizonid slightly posterior to nerve ring. "Mucro" not observed. Two ampullae present in body cavity of slender part of oesophagus. Oesophagus typical of the genus, anterior part tubular, somewhat bent. Oesophageal bulb short, cylindroid 127 (116-143) μm long. Dorsal oesophageal gland nucleus and subventral gland nuclei located at 27% (23-31) and 53% (50-59) of oesophageal bulb from its anterior end, respectively. Cardia hemispherical.

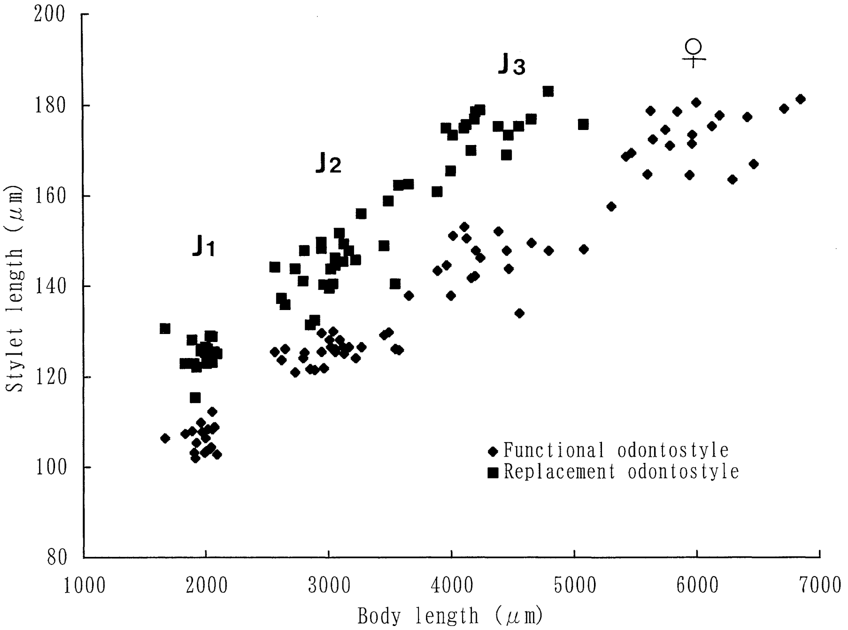

Fig. 2. Relationship between lengths of bodies and stylets of juveniles and females of *Longidorus ishigakiensis* n. sp.

Reproductive organ amphidelphic. Both branches almost equally developed, the anterior branch comprising 4.6% (3.5-6.6) and the posterior one 4.2% (2.5-6.3) of the body length. Vulva transverse slit, slightly anterior to equatorial of the body. Vagina extending about one-thirds of body diameter at vulva, cuticularized, its inner part surrounded by sphincter muscles. Ovaries reflexed; oviduct separated from uterus by sphincter. No sperm observed in the uteri. Prerectum 12 (8-16) times anal body widths long. Rectum 0.8 (0.7-1.0) times anal body widths long. Tail bluntly conoid to almost hemispherical, dorsally convex, more than one anal body diameter long, with two caudal pores on each side.

Male. Not found.

Juveniles. Three developmental stages are recognized in juveniles. They are distinctly separated by differences in the lengths of bodies, functional odontostyles and replacement odontostyles (Fig. 2). They are also separated by gaps of the following measurements; lip region width and body width at guiding ring. Additionally, the first-stage juvenile can be distinguished from others by the following characters: the anterior part of replacement odontostyle situated in the wall of odontophore. The tails of the first, second and third-stage juveniles are rounded. There is no significant difference between juveniles throughout the stages and females in the shape of the anterior region.

Type habitat and locality. Specimens were collected from soil around roots of *Pleioblastus linearis* Nakai in Ishigaki Is., Okinawa Prefecture, Japan.

Type specimens. Holotype (Slide nos.: 93-1) collected by Mr. T. Fukaishi on August, 1993, is deposited in the Herbarium and Insect Museum of the National Institute of Agro-Environmental Sciences (NIAES), Tsukuba, Ibaraki, Japan. Paratypes: 14 females (Slide nos.: 93Li2-15) and 63 juveniles (Slide nos.: 93Li22-40) are deposited at the NIAES. Two paratype females will be distributed to each of the following institutes: (Slide nos.: 93Li16, 17) USDA Nematode Collection, Beltsville, Maryland, U.S.A.; (Slide nos.: 93Li18, 19) Rothamsted Experimental Station, Harpenden, Herts., England; and (Slide nos.:

93Li20, 21) Laboratoire des Vers, Muséum National d'Histoire Naturelle, Paris, France.

Diagnosis and relationships. *Longidorus ishigakiensis* n. sp. is characterized by the continuous lip region, bluntly rounded tail, medium body size, long odontostyle, and extremely posteriorly located guiding ring.

This new species resembles *L. laricis* Hirata, 1995 (Hirata, 1995), *L. litchii* Xu and Cheng, 1992 (Xu and Cheng, 1992), *L. naganensis* Hirata, 1995 (Hirata, 1995) and *L. orongorongensis* Yeates, Van Etteger and Hooper, 1992 (Yeates et al., 1992) in long odontostyle and especially posterior position of guiding ring. The new species is distinguished from these four species by its larger c′ value (1.1 (1.0-1.2) vs. 0.74 (0.64-0.90) in *L. laricis*; 0.70 (0.61-0.79) in *L. litchii*; 0.77 (0.69-0.89) in *L. naganensis* and 0.68 (0.60-0.73) in *L. orongorongensis*). It also differs from *L. laricis* in having longer tail length (40.2 (35.3-46.3) μm vs. 29.5 (26.0-33.1) μm), narrower lip region width (13.8 (13.3-14.3) μm vs. 17.2 (15.7-18.2) μm), continuous lip region (distinctly offset in *L. laricis*) in female, and rounded tail of the first-stage juvenile (elongate conoid with a digitate tip in *L. laricis*); from *L. litchii* in having larger a value (117 (106-130) vs. 78 (72-84)), longer tail length (40.2 (35.3-46.3) μm vs. 28.0 (25.5-32.0) μm) in female, and rounded tail of the first-stage juvenile (elongate conoid with a long digitate tip in *L. litchii*); from *L. naganensis* in having larger a value (117 (106-130) vs. 72 (66-78)), narrower lip region width (13.8 (13.3-14.3) μm vs. 16.6 (15.7-18.0) μm), and longer body length (5.97 (5.31-6.85) mm vs. 4.36 (3.83-5.18) mm); and from *L. orongorongensis* in having more posteriorly located guiding ring (90.7 (83.1-94.6) μm vs. 67.8 (63-73) μm), larger a value (117 (106-130) vs. 88.4 (81-106)), narrower lip region width (13.8 (13.3-14.3) μm vs. 22.6 (22-23) μm), narrower body width at mid-body (50.9 (45.9-57.1) μm vs. 79.2 (72-87) μm), and narrower body width at anal body width (36.6 (33.9-40.0) μm vs. 59 (51-68) μm).

The code in the polytomous key (Chen et al., 1997; Loof and Chen, 1999) is A7; B2; C5; D1; E1; F 3; G23; H12; I1.

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和文摘要

石垣島から発見されたナガハリセンチュウ属の1新種の記載

平田　賢司

沖縄県石垣島のリュウキュウチク（イネ科）の根辺土壌から発見されたナガハリセンチュウ属の未記載種を *Longidorus ishigakiensis* n. sp. と命名・記載した。本種は、ナガハリセンチュウ属の既知種の中でも、歯針長及び頭端から口針導環までの長さが著しく長い。本種の近似種には、*L. laricis* Hirata, 1995、*L. litchii* Xu and Cheng, 1992、*L. naganensis* Hirata, 1995、*L. orongorongensis* Yeates, Van Etteger and Hooper, 1992の4種があるが、本種のc′値は、これらの4種と比べて大きく異なる。また、本種は、*L. laricis* と比べて、尾長が長く、唇部にくびれがなく、*L. litchii* とは、尾長が長く、a値が大きく、*L. naganensis* とは、体長が長く、a値が大きく、*L. orongorongensis* と比べて、頭端から口針導環までの長さが長く、a値が大きいなどの点で区別される。本種の幼虫齢期は、体長、歯針長及び替歯針長などの値から3齢期に分けられた。